

IN THE CLAIMS

Please amend the claims as follows:

Claims 1-37 (Canceled).

Claim 38 (Currently Amended): A method for designing an architecture and specifications of a hardware and software system of a product implemented by an electrical architecture designing device, the method comprising:

defining services in a level of a hierarchical list on a first side of a display of the electrical architecture designing device, each of the services being a function that can be performed by the product for a user of the product, the hierarchical list being arranged such that each item on a same level in the hierarchical list has a same indentation amount from an edge of the display and each level has a different indentation amount;

defining, for each one of the services, at least one use case, which is a context or situation that the system is in, as a lower level in the hierarchical list on the display;

associating, in the electrical architecture designing device, each use case with a user request, and an initial state and a final state of the system, and, when selected from the hierarchical list on the first side of the display, the use case and the associated user request, initial state, and final state are displayed on a second side of the display with the hierarchical list on the first side of the display;

defining operations, in the course of which, for each state, a set of elementary operations are defined which correspond to a response for the system when said system is in said each state;

specifying the system architecture by defining characteristics of electronic control units and networks to perform the response for the system when said system is in said each state;

mapping the elementary operations onto calculating units, including dividing the product to be mapped into a plurality of zones, routing electrical wires between components of the specified system architecture of the product, and linking at least a first zone of the plurality of zones to a second zone of the plurality of zones with connectors through which the routing of the electrical wires between the components passes, and, when selected from the hierarchical list on the first side of the display, the mapped calculating units are displayed on the second side of the display with the hierarchical list on the first side of the display;

and executing at least one of:

identifying flow of data on the networks as a function of the mapping; and

identifying specifications associated with interfaces of the calculating units as a function of the mapping.

Claim 39 (Previously Presented): A method according to claim 38, wherein the mapping comprises, for each service, a choice among a plurality of mapping modes comprising:

mapping the service onto a single calculating unit of the calculating units,

master-slave mapping, in which an elementary control operation that controls the single service activates, depending on a current state of the service in the system, mapping of elementary operations of the service onto one of the calculating units, and

distributed mapping, in which the elementary operations are distributed over at least two calculating units of the calculating units and, onto each of the calculating units, the elementary control operation that controls the service is mapped and activates, depending on a current state of the service in the system, mapping of the elementary operations of the service onto the calculating units.

Claim 40 (Previously Presented): A method according to claim 39, wherein the elementary control operations are generated automatically with:

as inputs, all data necessary for calculation of transitions of a control automaton of the service and the transitions are transformations, via an elementary operation, of the user's requests, and

as an output, a datum representing the state in which the service finds itself.

Claim 41 (Previously Presented): A method according to claim 38, wherein, in the identifying data flows, a state of each data flow is determined relative to a given electronic messaging system.

Claim 42 (Previously Presented): A method according to claim 38, wherein, given a use case,

a performance constraint is imposed on the use case and on certain of the elementary operations executed in the initial state of the use case,

a list of those executions of elementary operations, executions of software and hardware drivers, writes and reads in data frames, taking into account of information by sensors and actuators, and data frame transfer to a network that are implemented following mapping of the elementary operations is then automatically synthesized,

requirements of delay of execution and/or of response time of transmission, the reading and writing of the data frames, and execution of the drivers and of the elementary operations are then specified,

response times of the sensors and the actuators are indicated,

a fact that a performance constraint is satisfied for a mapping of the elementary operations is validated or requirements of delay of execution and/or of response time to satisfy the performance constraint are specified.

Claim 43 (Previously Presented): A method according to claim 38, wherein if a service has at least two variants, and the at least two variants have shared elementary operations, then the elementary operations are automatically mapped onto the same calculating units during mapping of one of the variants.

Claim 44 (Currently Amended): A device for design of a specification of a hardware and software system of a product, comprising:

means for defining services in a level of a hierarchical list on a first side of a display of the device, each of the services being a function that can be performed by the product for a user of the product, the hierarchical list being arranged such that each item on a same level in the hierarchical list has a same indentation amount from an edge of the display and each level has a different indentation amount;

means for defining, for each one of the services, at least one use case which is a context or situation that the system is in, as a lower level in the hierarchical list on the display;

means for associating each use case with a user request, and an initial state and a final state of the system, and, when selected from the hierarchical list on the first side of the display, the use case and the associated user request, initial state, and final state are displayed on a second side of the display with the hierarchical list on the first side of the display;

means for defining operations, in the course of which, for each state, a set of elementary operations are defined which correspond to a response for the system when said system is in said each state;

means for specifying the system architecture by defining characteristics of electronic control units and networks to perform the response for the system when said system is in said each state;

means for mapping the elementary operations onto calculating units, and the mapping includes dividing the product to be mapped into a plurality of zones, routing electrical wires between components of the specified system architecture of the product, and linking at least a first zone of the plurality of zones to a second zone of the plurality of zones with connectors through which the routing of the electrical wires between the components passes, and, when selected from the hierarchical list on the first side of the display, the mapped calculating units are displayed on the second side of the display with the hierarchical list on the first side of the display;

and at least one of:

means for identifying flow of data on the networks as a function of the mapping; and

means for identifying specifications associated with interfaces of the calculating units as a function of the mapping.

Claim 45 (Currently Amended): A device according to claim 44, further comprising means for selecting the hierarchical list, selection of each selection means causing a different screen to appear on the second side of the display.

Claim 46 (Previously Presented): A device according to claim 45, wherein, for at least one screen, the hierarchical list represents, at a first level of hierarchy, a plurality of services and, at a second level of hierarchy, a plurality of use cases for each service.

Claim 47 (Previously Presented): A device according to claim 46, wherein, for at least one screen, each use case comprises an initial context or situation of the system, a user's request to the system, and a response of the system corresponding to a change of a state of the system.

Claim 48 (Previously Presented): A device according to claim 46, wherein, in at least one screen, states and associated state transitions are defined for each use case of a service.

Claim 49 (Canceled).

Claim 50 (Previously Presented): A device according to claim 44, wherein each phase is composed of a set of combinations of modes of operation of a vehicle, and the modes are not directly controlled by the response of the system to the services associated with the user request.

Claim 51 (Previously Presented): A device according to claim 45, wherein, for at least one screen, the hierarchical list represents a plurality of services at a first level of hierarchy and represents phases of the service at a second level of hierarchy.

Claim 52 (Previously Presented): A device according to claim 47, wherein, for at least one screen, the hierarchical list represents a plurality of services at a first level of hierarchy and of states of the service at a second level of hierarchy.

Claim 53 (Previously Presented): A device according to claim 51, wherein, within the hierarchical list, a hierarchical level in a given state describes the elementary operations.

Claim 54 (Previously Presented): A device according to claim 45, wherein, for at least one screen, mapping of elementary operations onto the components represented in a representational view is effected.

Claim 55 (Previously Presented): A device according to claim 54, further comprising, for at least one screen, a representational view representing an envelope of the component and each elementary operation that the component controls or instructs.

Claim 56 (Previously Presented): A device according to claim 45, further comprising, for at least one screen, a representational view representing an envelope of a service and each elementary operation that the service comprises.

Claim 57 (Previously Presented): A device according to claim 45, wherein, for at least one screen, at a first level of hierarchy, the hierarchical list represents the calculating units of the system and, at a second level of hierarchy, elementary operations electronically monitored or controlled by each calculating unit.

Claim 58 (Previously Presented): A device according to claim 57, wherein, for each screen, a hierarchical level represents, for each calculating unit, the services that are mapped at least partly onto the calculating units.

Claim 59 (Previously Presented): A device according to claim 57, wherein, for each screen, a representational view represents, for each calculating unit, modes in which the calculating units must function.

Claim 60 (Previously Presented): A device according to claim 45, wherein, for at least one screen, a representational view represents at least one network and the components connected to it.

Claim 61 (Previously Presented): A device according to claim 45, wherein, for at least one screen, at a first level of hierarchy, the hierarchical list represents the calculating units of the system and, at a second level of hierarchy, for each calculating unit, data frames are transported on buses to which the calculating units and/or the components directly connected to the calculating units are connected.

Claim 62 (Previously Presented): A device according to claim 45, wherein, for at least one screen, the hierarchical list represents frames at a first level of hierarchy and, at a second level of hierarchy, for each frame of the frames, the data contained in the frames.

Claim 63 (Previously Presented): A device according to claim 45, wherein, for at least one screen, a representational view represents the components and/or networks and a projection of a service onto the components and/or networks.



Claim 64 (Previously Presented): A device according to claim 45, wherein, for at least one screen, a hierarchical level describes, for each elementary operation, input and output interface data flows, and, for each data flow, a driver and the component and/or the elementary operation with which the data flow is exchanged.

Claim 65 (Previously Presented): A device according to claim 45, wherein, for at least one screen, the hierarchical list represents, at a first level of hierarchy, a plurality of services and, at a second level of hierarchy, a plurality of service variants, for each service.

Claim 66 (Previously Presented): A device according to claim 45, wherein, for at least one screen, the hierarchical list represents, at a first level of hierarchy, a plurality of electronic components and, at a second level of hierarchy, a plurality of similar electronic components, for each electronic component.

Claim 67 (Previously Presented): A device according to claim 45, wherein, for at least one representational view, a selection of an element of the representational view by a pointing device gives access to a representation of the functioning of the element.

Claim 68 (Previously Presented): A device according to claim 44, wherein, for a use case, given partial or complete mapping of the services, the set of elementary operations in the architecture and the set of data exchanged corresponding to execution of the use case are automatically identified.

Claim 69 (Previously Presented): A device according to claim 44, wherein, for a use case, if a performance constraint is imposed on the use case, the set of elementary operations in the architecture, a set of exchanged data frames, and a set of sensors necessary and/or a set of actuators activated are automatically identified, in such a manner as to assign respectively thereto specific constraints of delay of execution, of delay of transmission, of delay of activation, and/or to validate the constraints already imposed.

Claim 70 (Previously Presented): A device according to claim 44, further comprising, for objects, hardware components and/or services offered to the client, a graphic representation comprising:

- a contour representing the object,
- representations of other objects with which the object communicates, and
- representations of data exchanged with the other objects.

Claim 71 (Previously Presented): A device according to claim 70, wherein, when an envelope represents a hardware component, data representations are effected for a service.

Claim 72 (Previously Presented): A device according to claim 44, further comprising, for each bus, a representation of components that are connected directly thereto and, for components directly connected to at least two buses, for each of these at least two buses, associated with the component, an identifier of each other bus to which the component is directly connected.

Claim 73 (Previously Presented): A device according to claim 72, wherein the identifier is a graphical element.

Claim 74 (Currently Amended): A computer readable storage medium encoded with instructions which when executed by a processor cause a computer to implement a method comprising:

defining services in a level of a hierarchical list on a first side of a display, each of the services being a function that can be performed by a product for a user of the product, the hierarchical list being arranged such that each item on a same level in the hierarchical list has a same indentation amount from an edge of the display and each level has a different indentation amount;

defining, for each one of the services, at least one use case, which is a context or situation that the system is in, as a lower level in the hierarchical list on the display;

associating each use case with a user request, and an initial state and a final state of the system, and, when selected from the hierarchical list on the first side of the display, the use case and the associated user request, initial state, and final state are displayed on a second side of the display with the hierarchical list on the first side of the display;

defining operations, in the course of which, for each state, a set of elementary operations are defined which correspond to a response for the system when said system is in said each state;

specifying the system architecture by defining characteristics of electronic control units and networks to perform the response for the system when said system is in said each state;

mapping the elementary operations onto calculating units, including dividing the product to be mapped into a plurality of zones, routing electrical wires between components of the specified system architecture of the product, and linking at least a first zone of the plurality of zones to a second zone of the plurality of zones with connectors through which

the routing of the electrical wires between the components passes, and, when selected from the hierarchical list on the first side of the display, the mapped calculating units are displayed on the second side of the display with the hierarchical list on the first side of the display;

and executing at least one of:

identifying flow of data on the networks as a function of the mapping; and

identifying specifications associated with interfaces of the calculating units as a function of the mapping.

Claim 75 (Previously Presented): A method according to claim 38, wherein the product that includes the hardware and software system is a vehicle.

Claim 76 (Canceled).

Claim 77 (Previously Presented): A method according to claim 38, wherein the mapping includes defining a prohibited subzone within at least one of the plurality of zones such that the routing is not allowed to pass through the prohibited subzone.